

IN THE CLAIMS

1. A vacuum processing apparatus for generating a plasma including a vacuum processing chamber having a stage for mounting a substrate to be processed, and a carrier port for carrying the substrate onto and off the stage for subjecting the substrate on the stage to a plasma processing in the vacuum processing chamber, said apparatus, comprising:

a deposit shield disposed along an inner peripheral wall of the vacuum processing chamber, and having a notch portion at a position facing the carrier port;

a shutter having a shape fitted into the notch portion of the deposit shield, having a same inside curvature as an even curvature of an inner surface of the deposit shield when the shutter is fitted into the notch portion, and being configured to be elevated;

a sealing groove being configured to receive an O-ring therein, said sealing groove being formed in an end face of the shutter opposing a flat side face of the deposit shield; and

a conduction groove being configured to receive therein a spiral seal made of metal, said conduction groove formed in the end face of the shutter parallel to and outside of the sealing groove, the spiral seal electrically connecting the deposit shield to the shutter,

wherein each of the deposit shield and the shutter is configured to have a ground potential, the shutter is configured to be retreated from the notch portion when moving the substrate in and out of the stage through the carrier port and configured to be fitted into the notch portion of the deposit shield when the plasma processing is conducted, thus surrounding a plasma generation region by the even curvature of the shutter and deposit shield thereby producing a uniform plasma.

2. A vacuum processing apparatus for generating a plasma including a vacuum processing chamber having a stage for mounting a substrate to be processed, and a carrier port for carrying the substrate onto and off the stage for subjecting the substrate on the stage to a plasma processing in the vacuum processing chamber, said apparatus, comprising:

a deposit shield disposed along an inner peripheral wall of the vacuum processing chamber, and having a notch portion at a position facing the carrier port;

a shutter having a shape fitted into the notch portion of the deposit shield, having a same inside curvature as an even curvature of an inner surface of the deposit shield when the shutter is fitted into the notch portion, and being configured to be elevated;

a sealing groove being configured to receive an O-ring therein, said sealing groove being formed in an end face of the shutter opposing a flat side face of the deposit shield; and

a conduction groove being configured to receive therein a spiral seal made of metal, said conduction groove formed in the end face of the shutter parallel to and outside of the sealing groove, the spiral seal electrically connecting the deposit shield to the shutter,

wherein when the plasma is generated in the vacuum processing chamber, the shutter is raised by a shutter mechanism to be fitted into the notch portion thereby closing the carrier port and forming the same inner surface curvature as the even curvature of the inner surface of the deposit shield, and

wherein further each of the deposit shield and the shutter is configured to have a ground potential, the shutter is configured to be retreated from the notch portion

when moving the substrate in and out of the stage through the carrier port and configured to be fitted into the notch portion of the deposit shield when the plasma processing is conducted, thus surrounding a plasma generation region by the even curvature of the shutter and deposit shield thereby producing a uniform plasma.

3. A vacuum processing apparatus for generating a plasma, including a vacuum processing chamber having a stage for mounting a substrate to be processed, and a carrier port provided on a peripheral wall of the vacuum processing chamber for carrying the substrate onto and off the stage for subjecting the substrate on the stage to a plasma processing in the vacuum processing chamber, said apparatus, comprising:

a deposit shield disposed along an inner peripheral wall of the vacuum processing chamber, and having a notch portion with a flat end face;

a shutter having a shape fitted into the notch portion of the deposit shield, having a same inside curvature as an even curvature of an inner surface of the deposit shield when the shutter is fitted into the notch portion, and being configured to be elevated;

a sealing groove being configured to receive an O-ring therein, said sealing groove being formed in an end face of the shutter opposing a flat side face of the deposit shield; and

a conduction groove being configured to receive therein a spiral seal made of metal, said conduction groove formed in the end face of the shutter parallel to and outside of the sealing groove, the spiral seal electrically connecting the deposit shield to the shutter.

4. The vacuum processing apparatus according to claim 3, wherein a disk-shaped evacuation plate is disposed around the stage, and the shutter and the evacuation plate are brought into contact with each other and electrically connected to each other when the shutter is raised.

5. The vacuum processing apparatus according to Claim 3, wherein each of the deposit shield and the shutter comprises a heating mechanism.

6. A vacuum processing apparatus for generating a plasma, including a vacuum processing chamber having a stage for mounting a substrate to be processed, and a carrier port provided on a peripheral wall of the vacuum processing chamber for carrying the substrate onto and off the stage for subjecting the substrate on the stage to a plasma processing in the vacuum processing chamber, said apparatus, comprising:

a deposit shield disposed along an inner peripheral wall of the vacuum processing chamber, and having a notch portion at a position facing the carrier port, the notch having an end face having an L-shape cross section, the end face of the L-shape cross section having a convex outer periphery;

a shutter having a shape fitted into the notch portion of the deposit shield, having a same inside curvature as an even curvature of an inner surface of the deposit shield when the shutter is fitted into the notch portion, and being configured to be elevated;

a sealing groove being configured to receive an O-ring therein, said sealing groove being formed in an end face of the shutter opposing a flat side face of the deposit shield; and

a conduction groove being configured to receive therein a spiral seal made of metal, said conduction groove formed in the end face of the shutter parallel to and outside of the sealing groove, the spiral seal electrically connecting the deposit shield to the shutter.

7. The vacuum processing apparatus according to claim 6, wherein a disk-shaped evacuation plate is disposed around the stage, and the shutter and the evacuation plate are brought into contact with each other and electrically connected to each other when the shutter is raised.

8. The vacuum processing apparatus according to claim 6, wherein each of the deposit shield and the shutter comprises a heating mechanism.

9. A vacuum processing apparatus for generating a plasma, including a vacuum processing chamber having a stage for mounting a substrate to be processed, and a carrier port provided on a peripheral wall of the vacuum processing chamber for carrying the substrate onto and off the stage for subjecting the substrate on the stage to a plasma processing in the vacuum processing chamber, said apparatus, comprising:

a deposit shield disposed along an inner peripheral wall of the vacuum processing chamber, said deposit shield having a first heating mechanism; and

a shutter configured to be elevated along the inner peripheral wall of the vacuum processing chamber, said shutter having a second heating mechanism,

wherein each of the deposit shield and the shutter is configured to have a grounded potential, the shutter is configured to be retreated when the substrate is

moved in and out of the stage through the carrier port and configured to be abutted on the deposit shield when the plasma processing is conducted, thus surrounding a plasma generation region by an even curvature of the shutter and deposit shield thereby generating a uniform plasma.

10. The vacuum processing apparatus according to claim 9, wherein a disk-shaped evacuation plate is disposed around the stage, and the shutter and the evacuation plate are brought into contact with each other and electrically connected to each other when the shutter is raised.